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Invention: MODULAR STANCHION STORAGE STRUCTURE

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SPECIFICATION

MODULAR STANCHION STORAGE STRUCTURE

BACKGROUND OF THE INVENTION

[0001] The present invention relates to a modular storage structure. In particular, the present invention relates to a modular stanchion storage system having at least one vertical support. A plurality of adjustable brackets can be mounted within a channel within the support to permit the adjustable attachment of a plurality of storage members. The storage system is configured to permit a user to use any number of storage components in various combinations to create a storage system that is individually tailored for the user's storage needs.

OBJECTS OF THE INVENTION

[0002] It is one object of the present invention to provide a modular storage system that can be easily adjusted and reconfigured by a user to include any number and combinations of storage components.

[0003] It is another object of the present invention to provide a modular storage system that can be configured within an enclosure without structurally modifying the enclosure.

[0004] It is yet another object of the present invention to provide a modular storage system that can be configured to accommodate precisely doors of varying height without drilling surfaces of the enclosure to mount the doors.

[0005] It is yet another object of the present invention to provide a modular storage system that can be configured to accommodate storage components using brackets, channels and locking assemblies which rotate a predetermined amount into a locked position.

[0006] It is yet another object of the present invention to provide a modular storage system including a wall track that can accommodate various support structures without needing to drill the wall to mount each support structure.

[0007] It is yet another object of the present invention to provide a modular storage system that can be configured to utilize vertical panels of varying predetermined thicknesses to create an enclosure or a storage system that resembles a bookcase.

[0008] It is another object of the present invention to provide a modular storage system that can be expanded to accommodate any increases in a user's storage needs.

SUMMARY OF THE INVENTION

[0009] Applicants have developed an innovative modular storage system that enables the user to adjustably configure the storage system. The storage system is configured to adjustably receive any number and/or combinations of storage components that can be adjustably received on one or more elongated vertical supports. The storage system includes at least one elongated vertical support having a length, a bottom portion for engaging a floor of an enclosure and a top portion for engaging either a ceiling or a wall. Each elongated vertical support includes a front portion and a rear portion. A middle portion interconnects the front portion and the rear portion. In accordance with the present invention, each elongated vertical support includes at least one channel formed therein, which is adapted to receive adjustable brackets for mounting storage components thereon. The front portion and the rear portion cooperate to form a channel on one or both sides of the middle portion. The front portion may also include a channel formed therein. Each of the channels is sized to receive at least one adjustable bracket. Each channel extends the length of the elongated vertical support. In accordance with the present invention, the elongated vertical supports may be formed from an extruded material (e.g., an extruded aluminum), a rolled steel or a reinforced plastic.

[0010] The rear portion of each elongated vertical support includes a first portion located adjacent the middle portion. The first portion cooperates with the middle portion to form at least a portion of the channels on opposing sides of the middle portion. The rear

portion also includes an open second portion spaced from the first portion. The open second portion is adapted to receive a vertical panel therein. The vertical panels may be provided to create a storage system having sides similar to a bookcase or create an enclosure. The open second portion is configured to support vertical panels having varying thickness. The open second portion may include a pair of spaced ribs forming a first panel receiving channel. The first panel receiving channel is capable of receiving therein a first vertical panel having a first predetermined thickness. An opening in an outer wall of the rear portion forms a second panel receiving channel. The second panel receiving channel is capable of receiving therein a second vertical panel having a second predetermined thickness. The second predetermined thickness is different from the first predetermined thickness. In accordance with the present invention, the pair of spaced ribs and the opening are oriented such that the second vertical panel contacts end surfaces of the pair of spaced ribs when located in the second panel receiving channel.

[0011] The elongated vertical supports are secured to the floor with a lower mounting member connected to the bottom portion of the elongated vertical support. The lower mounting member may have a floor mounting member adapted to be secured to the floor, a floor connection assembly for engaging the floor mounting member, and a lower connection assembly connecting the lower mounting member to the elongated vertical support. The floor connection assembly is adjustable with respect to the lower connection assembly for vertically adjusting the height of the elongated vertical support. The present invention, however, is not limited to an adjustable connection assembly; rather, it is contemplated that the vertical support may be secured directly to the floor.

[0012] The elongated vertical supports may be secured to either the wall or the ceiling using an upper mounting member connected to the top portion of the elongated vertical support. When the elongated vertical support is secured to the ceiling, an upper mounting

member is provided having a ceiling mounting member adapted to be secured to the ceiling, a ceiling connection assembly for engaging the ceiling mounting member, and an upper connection assembly connecting the upper mounting member to the elongated vertical support. In this arrangement, the upper mounting member has a construction similar to the lower mounting member. The ceiling connection assembly is adjustable with respect to the upper connection assembly for vertically adjusting the height of the elongated vertical support. The present invention, however, is not limited to an adjustable connection assembly; rather, it is contemplated that the vertical support may be secured directly to the ceiling. The lower mounting member and the upper mounting member cooperate to secure the elongated vertical support in a generally vertical position.

[0013] When the elongated vertical support is secured to the wall, the upper mounting member includes a horizontal support having a first end portion connected to the top portion of the elongated vertical support and a second end portion located adjacent the wall. The horizontal support has a complimentary structure with the elongated vertical support. A fixing block is secured to the second end portion of the horizontal support. The fixing block may be directly secured to the wall. The upper mounting member secures the elongated vertical support to the wall such that the elongated vertical support is spaced from the wall and the elongated vertical support is in a generally vertical position. The upper mounting member may further include a horizontal track assembly secured to the wall. The horizontal track assembly includes a first track. The first track portion is capable of receiving one or more fixing blocks. Multiple supports may be positioned along the track assembly by locating the fixing blocks therein. In accordance with the present invention, the horizontal track assembly may further include a second track. The second track is sized to receive an end portion of a horizontal panel therein. The horizontal panel extends between the elongated vertical supports to form a cover or a top shelf for modular storage system.

connected to and extends between the first and second door mounting brackets. At least one door is slidably received within and supported by the door receiving track assembly.

BRIEF DESCRIPTION OF THE DRAWINGS

[0017] The invention will be described in conjunction with the following drawings in which like reference numerals designate like elements and wherein:

[0018] Fig. 1 is a perspective view illustrating a storage system of the present invention;

[0019] Fig. 2 is a profile view illustrating an elongated vertical support;

[0020] Fig. 3A is a cross-sectional view illustrating the elongated vertical support shown in Fig. 2 supporting a vertical panel;

[0021] Fig. 3B is a cross-sectional view illustrating the elongated vertical support shown in Fig. 2 supporting another vertical panel;

[0022] Fig. 4 is a perspective view illustrating a lower portion of the elongated vertical support illustrating a connection assembly in accordance with an embodiment of the present invention;

✓ [0023] Figs. 5A, 5B and 5C are perspective views illustrating another connection assembly and fixing block in accordance with the present invention;

[0024] Fig. 6 is a cross-sectional view illustrating the floor/ceiling connection assembly;

[0025] Fig. 7 is a perspective view illustrating an upper portion of the elongated vertical support for a storage system secured to the ceiling;

[0026] Fig. 8 is a perspective view illustrating the elongated vertical support configured with a horizontal support;

[0027] Fig. 9 is a perspective view illustrating the horizontal support connected directly to the wall;

[0028] Figs. 10A and 10B are perspective views illustrating the elongated vertical support configured with a horizontal support and a horizontal track assembly;

[0029] Fig. 11 is a perspective view illustrating the elongated vertical support configured with a horizontal support and a vertical side panel;

[0030] Fig. 12 is a perspective view illustrating an adjustable bracket;

[0031] Fig. 13 is a perspective view illustrating an adjustable bracket integrally formed with a bracket for mounting a hanger bar;

[0032] Fig. 14 is a perspective view illustrating an embodiment of an engaging assembly of an adjustable bracket integrally formed with a shoe rack bracket;

[0033] Fig. 15 is a perspective view illustrating an embodiment of an adjustable bracket integrally formed with a clamping bracket for a storage component;

[0034] Fig. 16 is a perspective view illustrating a bar storage component connected to an elongated vertical support;

[0035] Fig. 17 is a perspective view illustrating a pair of shoe rack storage components;

[0036] Fig. 18A is a perspective view illustrating a shelf storage component;

[0037] Fig. 18B is a perspective view illustrating drawer and basket storage components secured to the elongated vertical supports;

[0038] Fig. 19 is a perspective view illustrating an adjustable bracket integrally formed with a door mounting bracket and connected to a door receiving track assembly;

[0039] Fig. 20 is a perspective view showing an adjustable bracket integrally formed with a door mounting bracket wherein the engaging assembly engages a side channel in the vertical support;

[0040] Fig. 21 is a perspective view showing another embodiment of the adjustable bracket integrally formed with a door mounting bracket wherein the engaging assembly engages a front channel in the vertical support;

[0041] Fig. 22 is a cross-sectional view of another embodiment of an elongated vertical support; and

[0042] Fig. 23 is a perspective view of a corner connector.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

[0043] Fig. 1 illustrates an enclosure 1 with a floor 2, a ceiling 3 and a wall 4 that is capable of receiving a storage system 10 in accordance with the present invention. The storage system 10 is disposed within the enclosure 1. The storage system 10 includes at least one elongated vertical support 20 and one or more storage components 120. The storage component 120 may contain closed drawers. The present invention, however, is not limited to this type of storage assembly; rather, it is contemplated that wire baskets, shelves, rods, brackets, hooks and other storage components are well within the scope of the present invention. It is contemplated that any combination of vertical support 20 may be used such that the storage system 10 may extend along one or more walls in an enclosure 1, as shown in Figs. 1, 8 and 11. It is further contemplated that the vertical supports do not need to be located adjacent a wall; rather, rows of storage may be created by mounting rows of vertical supports 20 in the center of the enclosure 1.

Elongated Vertical Support

[0044] The elongated vertical support 20 of Fig. 1 is shown in greater detail in Fig. 2. Each elongated vertical support 20 includes a bottom portion 22, a top portion 24, a front portion 26 and a rear portion 28. The elongated vertical support 20 also includes at least one channel 30. The elongated vertical support 20 can be formed from an extruded material, rolled steel, reinforced plastic, or any other suitable material. As illustrated in Fig. 1, the

vertical support 20 is sized to extend from the floor 2 to the ceiling 3. The present invention, however, is not limited to a vertical length extending the full height of the enclosure 1. The channel 30 extends the length of the elongated vertical support 20. Other sizes of the vertical support 20 are contemplated and considered to be well within the realm of the present invention. The storage system 10 can be manufactured from variously pre-sized elongated vertical supports 20 and storage components 120. However, it is contemplated that the storage system 10 can be custom fit to any variety of installation configurations. In this way, an infinite number of different adjustable storage systems can be contemplated.

[0045] A cross-sectional view of the elongated vertical support 20 is shown in Figs. 3A and 3B. The front portion 26 and the rear portion 28 of the elongated vertical support 20 are connected to each other by a middle portion 32. The front portion 26 and the rear portion 28 cooperate with each other to form a channel 30 on at least one side of the elongated vertical support 20. Figs. 3A and 3B illustrate the elongated vertical support 20 with a channel 30 along two of its sides. The present invention is not limited to channels 30 located along the sides of the vertical support 20; rather, it is contemplated that the front portion 26 may also include a channel, as shown in Fig. 22. The rear portion 28 includes a first portion 34 and an open second portion 36. The first portion 34 is located adjacent to the middle portion 32. The first portion 34 cooperates with the middle portion 32 to form at least a portion of the channel 30. The open second portion 36 of the elongated vertical support 20 includes a pair of spaced ribs 38. The pair of spaced ribs 38 form a first panel receiving channel 40. The open second portion 36 also forms a second panel receiving channel 42. The second panel receiving channel 42 is wider than the first panel receiving channel 40. The vertical supports 20 illustrated in Figs. 3A and 3B have a hollow interior construction. The present invention, however, is not limited to a hollow construction; rather, it is contemplated that the interior may be solid. It is also contemplated that reinforcements may

be located within the interior. Furthermore, it is also contemplated that electrical wiring may be fed through the hollow interior to permit the positioning of lights or other electrical components on the support structure 10 while hiding any electrical cords.

Vertical Side Panels

[0046] A first vertical panel 100, with a first predetermined thickness corresponding to the first panel receiving channel 40, can be used in conjunction with the elongated vertical support. A second vertical panel 102, with a second predetermined thickness corresponding to the second panel receiving channel 42, can also be used. The vertical panels 100 and 102 are provided to create an enclosure, if desired, or to improve the visual appearance of the storage system. Figs. 3A and 3B illustrate the first vertical panel 100 and the second vertical panel 102 inserted into the first panel receiving channel 40 and the second panel receiving channel 42, respectively, of the elongated vertical support 20. The first vertical panel 100 has a predetermined thickness corresponding to the first panel receiving channel 40, as shown in Fig. 3A. The second vertical panel 102 has a predetermined thickness corresponding to the second panel receiving channel 42, as shown in Fig. 3B. The pair of spaced ribs 38 cooperate to form the first panel receiving channel 40, acting as a guide for the positioning of the first vertical panel 100 into the first panel receiving channel 40. The second vertical panel 102, when inserted into the second panel receiving channel 42 formed by the open second portion 36 of the elongated vertical support 20, contacts the pair of spaced ribs 38 which form a stop for the second vertical panel 102.

[0047] The storage system 10 can be configured in the enclosure 1 with or without the use of first vertical panels 100 and/or second vertical panels 102. For example, a user can arrange the storage system 10 without using vertical panels at all, as shown in Fig. 1. The storage system 10 allows the user to develop his or her own arrangement, suited to his or her own tastes and storage requirements. The user can reconfigure the arrangement of the

storage system 10 at any time after installation, suitable to the changing tastes or requirements of the user over time.

[0048] The choice between the first vertical panel 100 and the second vertical panel 102 depends upon the thickness of panel needed or desired. It is contemplated that an optional track (not shown) can receive the side of the first vertical panel 100 and/or the second vertical panel 102 along the wall 4 spaced from the elongated vertical support 20. It is also contemplated that an optional track (not shown) can be mounted to the floor and receive either the first vertical panel 100 or the second vertical panel 120.

Lower Mounting Assembly

[0049] The storage system 10 can be mounted along multiple walls between the floor and ceiling, as shown in Figs. 1, 8 and 11. The bottom portion 22 of the elongated vertical support 20 is illustrated in Fig. 4. In the illustrated embodiment, the bottom portion 22 of the elongated vertical support 20 is fixedly mounted to the floor through the use of a lower mounting member 50. The lower mounting member 50 includes a lower connection assembly 56 that is inserted into the end of bottom portion 22 of the elongated vertical support 20. ^{not shown} The lower connection assembly 56 is illustrated in Figs. 5A-5C. The connection assembly 56 is configured to engage and receive the front portion 26, the rear portion 28 and the middle portion 32. The lower connection assembly 56 includes through-holes 12 which ^{not shown} can accommodate a screw or other fastener device to fixedly mount the lower connection assembly 56 to the floor 2. The lower connection assembly 56 can also include a threaded through-hole 14.

[0050] Preferably, the lower mounting member 50 includes a floor connection assembly 54 for connecting the lower mounting member 50. The floor connection assembly 54 is illustrated in Fig. 6. The floor connection assembly 54 is generally disk-shaped and includes a post 16 which engages the lower connection assembly 56 by threadably engaging

the threaded through-hole 14 of the lower connection assembly 56. By rotating the floor connection assembly 54 with respect to the lower connection assembly 56 along the threadable engagement therebetween, the distance between the floor connection assembly 54 and the lower connection assembly 56 is adjustable. Adjustment of this distance can accommodate differences of height between the lower connection assembly 56 and the floor 2. Additionally, the adjustment can vary the effective height of the elongated vertical support 20. The illustrated embodiment of the floor connection assembly 54 includes a disk-shaped cutout 18 facing opposite the post 16.

[0051] The lower mounting member 50 illustrated in Fig. 4 also includes a floor mounting member 52. The floor mounting member 52 can be fixedly attached to the floor 2 by a screw or other fastening device passing through a through-hole in the floor mounting member 52 and into the floor 2. The floor mounting member 52 has a disk shape complementary to the disk-shaped cutout 18 of the floor connection assembly 54, so that the floor mounting member 52 can be received within the disk-shaped cutout 18 of the floor connection assembly 54 when mounted to the floor 2. By fixedly mounting the floor mounting member 52 to the floor 2, deflection of the floor connection assembly 54, the lower connection assembly 56, and the elongated vertical support 20 can be prevented due to the cooperation of the floor mounting member 52 with the floor connection assembly 54. Used together, the floor mounting member 52, the floor connection assembly 54, and the lower connection assembly 56 (which together comprise the lower mounting member 50) can provide vertical height adjustment of the elongated vertical support 20 and also prevent sideways deflection of the elongated vertical support 20.

Ceiling Mounting Assembly

[0052] The top portion 24 of the elongated vertical support 20 is illustrated in greater detail in Fig. 7. In the illustrated embodiment, an upper mounting member 60 can be

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connected to the elongated vertical support 20. The upper mounting member 60 includes a ceiling mounting member 62, a ceiling connection assembly 64 and an upper connection assembly 66. The structure of the upper mounting member 60 (including the ceiling mounting member 62, the ceiling connection assembly 64 and the upper connection assembly 66) is similar in structure to the lower mounting member 50 (including the floor mounting member 52, the floor connection assembly 54, and the lower connection assembly 56). The upper connection assembly 66 can be slidably inserted into the top portion 24 of the elongated vertical support 20. The upper connection assembly 66 is configured to engage and receive the top portion of the front portion 26, the rear portion 28 and the middle portion 32 of the vertical support 20. The upper connection assembly 66 can be fixedly mounted directly to the ceiling 3 or it can be indirectly mounted to the ceiling 3 via the ceiling connection assembly 64 and/or the ceiling mounting member 62. Interaction between the upper mounting member 60 (which can include the upper connection assembly 66, the ceiling connection assembly 64, and the ceiling mounting member 62) and the ceiling 3 is similar to the interaction between the corresponding parts of the lower mounting member 50 and the floor 2.

[0053] The lower mounting member 50 and the upper mounting member 60 accommodate varying height differences between the floor 2 and the ceiling 3. For example, the floor connection assembly 54 and the ceiling connection assembly 64 can be rotated to vary the height between the connection assemblies and the elongated vertical support 20 to engage the floor 2 and the ceiling 3, respectively. The upper mounting member 60 illustrated in Fig. 7, including the ceiling connection assembly 64 and the ceiling mounting member 62, is generally used to secure the top portion 24 of the elongated vertical support 20 to the ceiling 3. Accordingly, this type of upper mounting member 60 is used in an enclosure 1 that includes a ceiling 3. It is also contemplated that the upper mounting member 60 may be

secured to the undersurface of a fixed shelf in a closet to mount the elongated vertical support 20 within the closet to create additional modular storage capacity.

Wall Mounting Assembly

[0054] Fig. 8 shows the elongated vertical support 20 mounted to the wall 4. In the illustrated embodiment, the upper mounting member 60 includes a horizontal support 70. The horizontal support 70 has a structure complimentary to the elongated vertical support 20, (i.e., it has a similar cross-sectional structure). The horizontal support 70 includes a first end portion 72, a second end portion 74 and receiving channels 80 and 82. The first end portion 72 of the horizontal support 70 is fixably connected to the top portion 24 of the elongated vertical support 20 through the use of a corner connector 140, illustrated in greater detail in Fig. 23. Alternatively, the elongated vertical support 20 and the horizontal support 70 can be formed integrally as one complete unit. The second end portion 74 of the horizontal support 70 is fixedly mounted to the wall 4 through the use of a fixing block 76. The fixing block 76 is configured to engage and receive the horizontal support 70 in a manner similar to the engagement of the elongated vertical support 20 and the lower connection assembly 56 and the upper connection assembly 66. The fixing block 76 may be fastened to the horizontal support 70 using a suitable fastener. The fixing block 76 is also preferably bolted to the wall 4 as shown in Fig. 9.

[0055] The lower connection assembly 56, the upper connection assembly 66, and the fixing block 76 can be shaped to accommodate the first vertical panel 100 and the second vertical panel 102. For example, the side cut-out 57 of the lower connection assembly 56, the upper connection assembly 66, and the fixing block 76, which lines up with the first panel receiving channel 40 and the second panel receiving channel 42 of the elongated vertical support 20 (or which lines up with the first receiving channel 80 and second receiving

channel 82 of the horizontal support 70), can have a cut-out which accommodates the first vertical panel 100 and the second vertical panel 102.

[0056] The length of the horizontal support 70, and the distance of the bottom portion 22 of the elongated vertical support 20 from the wall, can be arranged such that the elongated vertical support 20 is configured in a substantially vertical position. It is also contemplated that the elongated vertical support 20 can be aligned at angles greater than or less than 90° to the floor. Additionally, the horizontal support 70 can extend from the elongated vertical support 20 at angles greater than or less than 90° to the elongated vertical support 20, to accommodate a sloping wall or other irregular mounting surface.

[0057] The elongated vertical support 20 and the horizontal support 70 mounted to the wall 4 is illustrated in Figs. 9, 10A and 10B. In Fig. 9, the horizontal support 70 is mounted directly to the wall 4 using the fixing block 76. In Figs. 10A and 10B, the horizontal support 70 is mounted to the wall 4 indirectly via a horizontal track assembly 90. The horizontal track assembly 90 is fixedly mounted to the wall 4 by the use of fasteners such as screws or other devices passing through through-holes in the horizontal track assembly 90. The horizontal track assembly 90 includes a first track 92 shaped to receive the fixing block 76 mounted to the horizontal support 70, as shown in Fig. 10A. The horizontal track assembly 90 can also include a second track 94 shaped to receive the fixing block 76 and a horizontal panel 98, as shown in Fig. 10B. The fixing block 76 is mounted to the horizontal track assembly 90 such that the fixing block 76 can be slidable within the first track 92 and/or the second track 94 of the horizontal track assembly 90. The horizontal panel 98 can be used in conjunction with the horizontal track assembly 90, as shown in Fig. 10B, to create an enclosed storage area or a top shelf. The second track 94 is shaped to receive an end portion 96 of the horizontal panel 98. The horizontal panel 98 is supported by the second track 94

and the horizontal support 70. The elongated vertical support 20 used in conjunction with the horizontal support 70 and a vertical panel 100 is illustrated in Fig. 11.

Adjustable Mounting Bracket

[0058] As illustrated, the storage system 10 is modular. Various storage components 120 may be mounted to the elongated vertical supports 20. The adjustable brackets for securing the storage components will now be described in greater detail. An adjustable bracket 110 is illustrated in Fig. 12. The adjustable bracket 110 can be cast from an alloy, plastic or other suitable material. The adjustable bracket 110 includes an engaging assembly 112. The engaging assembly 112 has a slanted cross-section that is complementary with the surfaces of the front portion 26 and the rear portion 28 adjacent the channels 30.

[0059] The adjustable bracket 110 includes a locking assembly 113 that is attached to the engaging assembly 112 via a screw or other fastener 114 passing through a through-hole in the adjustable bracket 110.

[0060] The locking assembly 113 is illustrated in greater detail in Fig. 13. The locking assembly 113 has a width that is less than its height. A portion of the top edge and the bottom edge of the locking assembly 113 is flat and perpendicular to the side edges. Another portion of the top edge and the bottom edge of the locking assembly 113 is beveled concentric about the center hole of the locking assembly 113.

[0061] The primary axis of the locking assembly 113 can be aligned in parallel with the channel 30 while attached via the fastener 114 to the adjustable bracket 110. In this alignment, the width of the locking assembly 113 corresponds to the width of the channel 30 such that the locking assembly 113 can be inserted into the channel 30 while the engaging assembly 112 of the adjustable bracket 110 is brought into contact with the front portion 26 and the rear portion 28 of the elongated vertical support 20. Alternatively, the locking assembly 113 first can be inserted into the channel 30, and the adjustable bracket 110 next

can be brought into contact with the front portion 26 and rear portion 28 of the elongated vertical support 20 and secured with the fastener 114. The fastener 114 connecting the locking assembly 113 to the adjustable bracket 110 is rotated while the locking assembly 113 is positioned vertically in an unlocked position within the channel 30. Rotating the fastener 114 causes the locking assembly 113 to rotate into a locked position within the channel 30. In this position, the locking assembly 113 can provide resistance against movement of the adjustable bracket 110 along the axis of the channel 30. Additionally, the locking assembly 113 in the locked position cannot be removed from the channel 30 of the elongated vertical support 20 and/or the horizontal support 70 due to the height of the locking assembly 113, now rotated at 90° to the axis of the channel 30, being greater than the width of the channel 30. Prior to rotating the locking assembly 113 into the locked position, it is possible to adjust the position of the adjustable bracket 110 along the elongated vertical support 20 (or the horizontal support 70) into any number of positions along the elongated vertical support 20 (or the horizontal support 70). It is also possible to remove the adjustable bracket 110 and the locking assembly 113 from the channel 30. When the locking assembly 113 is in the locked position, it cannot be rotated further due to the flat portions of the top and bottom edges of the locking assembly 113 contacting the insides of the channel 30 (formed by the front portion 26 and the rear portion 28 of the elongated vertical support 20). The flat portions of the top and bottom edges of the locking assembly 113 provide a stop for rotation of the locking assembly 113 beyond than 90°, as the square corners of the locking assembly 113 exceed the radius of the rounded corners of the locking assembly 113.

[0062] During tightening of the fastener 114 connecting the locking assembly 113 to the adjustable bracket 110, the locking assembly 113 is pulled towards the adjustable bracket 110, drawing the engaging assembly 112 forceably against the front portion 26 and rear portion 28 of the elongated vertical support 20 (or the corresponding structures of the

horizontal support 70) which form the channel 30. The friction between the engaging assembly 112 of the adjustable bracket 110 and the elongated vertical support 20 and/or the horizontal support 70 also provides a secure mounting point for the adjustable bracket 110 on the elongated vertical support 20 and the horizontal support 70, preventing sliding of the adjustable bracket 110 along the channel 30. A variation of the engaging assembly 112 of the adjustable bracket 110 is illustrated in Fig. 14. In the embodiment illustrated in Fig. 14, the engaging assembly 112 is integrated into the storage component 120 (a shoe rack is illustrated).

Storage Components

[0063] Various storage components for use in the modular storage system will now be described in greater detail. An adjustable bracket 110 having a support assembly 118 is illustrated in Fig. 15. The support assembly 118 includes a top part 1181 and bottom part 1182 adjustable with respect to each other and operable to clamp onto a storage component 120. For example, the support assembly 118 is clampable onto a shelf, as shown in Fig. 18A. The support assembly 118 may be used to support a drawer assembly, as shown in Fig. 18B. The support assembly 118 may also be used to support a basket assembly having one or more slidable baskets, as shown in Fig. 18B. The top and bottom parts of the support assembly 118 can accommodate a multitude of other storage components 120, including shelves of various thicknesses and/or a drawer, for example. The support assembly 118 is mountable to the elongated vertical support 20 and/or the horizontal support 70 via the engaging assembly 112 in conjunction with the locking assembly 113 and the channel 30. The adjustable bracket 110 including the support assembly 118, shown in Fig. 15, is mountable to the channel 30 by inserting the locking assembly 113 into the channel 30, rotating it via the fastener 114 into a locked position, and bringing the engaging assembly 112 of the adjustable bracket 110 into

frictional contact with the front portion 26 and rear portion 28 of the elongated vertical support 20.

[0064] Various storage components 120 are used in conjunction with corresponding adjustable brackets 110 and support assemblies 118. For example, the adjustable bracket 110 can be configured so that the support assembly 118 can accommodate a storage component 120 shaped as a bar 126, as illustrated in Fig. 16, which extends between two support assemblies 118 of two corresponding adjustable brackets 110 mounted to adjacent elongated vertical supports 20. The engaging assembly 112 of the adjustable bracket 110 is similar to previously discussed embodiments in that it engages the front portion 26 and rear portion 28 of the elongated vertical support 20 corresponding to the channel 30. The adjustable bracket 110 can include a support assembly 118 that branches off from the elongated vertical support 20 such that it provides numerous support areas for bars which extend between the two support assemblies 118 to create a shoe rack 124, as shown in Fig. 17. In yet another embodiment illustrated in Fig. 1, the adjustable bracket 110 can include a support assembly 118 that can accommodate a drawer 128. It is contemplated that many different types of storage components 120 can be accommodated by adjustable brackets 110 and their corresponding support assemblies 118.

[0065] The storage component 120 can include edging in order to strengthen the storage component 120 as illustrated in Fig. 18A. For example, the shelf 122 can include edging along the length of the edge of the shelf 122. The edging can include endcaps secured to ends of the edging. The adjustable bracket 110, with support assembly 118 designed to accommodate a shelf 122, can also accommodate the edging used in conjunction with the shelf 122. Alternatively, the structure of the adjustable bracket 110 can incorporate the shelf edging into the structure of the support assembly 118, providing the adjustable bracket 110 and edging as one integral unit.]

Door Mounting Assembly

[0066] A door mounting bracket 130 is illustrated in Fig. 19. The door mounting bracket 130 includes an adjustable bracket 110 with a corresponding engaging assembly 112 and support assembly 118. When installed into a locked position on the elongated vertical supports 20, the support assemblies 118 of the door mounting bracket 130 extend outward from their corresponding elongated vertical supports 20. The door mounting bracket 130 includes a mounting surface at the extremity of the door mounting bracket 130, opposite the engaging assembly 112. The engaging assembly 112 of the door mounting bracket 130 can be oriented at 90° to the extension of the corresponding support assembly 118, as shown in Fig. 20. In this configuration, the door mounting bracket 130 can be mounted to a channel 30 on the side of the elongated vertical support 20. In another embodiment of the door mounting bracket 130, the engaging assembly 112 is oriented in the direction of extension of the support assembly 118 as shown in Fig. 21. In this arrangement, the door mounting bracket 130 can be mounted to a channel 30 on the front of the elongated vertical support 20.

[0067] Other embodiments of various adjustable brackets 110 can be similarly designed to facilitate mounting of the adjustable brackets 110 to the front or side channels 30 of the vertical support 20. It is contemplated that the orientation of the engaging assemblies 112 with respect to the support assemblies 118 can be oblique, and not limited to angles of 0° or 90°. The adjustable brackets 110 can be mounted to the top or side channels 30 of the horizontal support 70 at varying angles as well.

[0068] Additional elongated vertical supports 20 can be used, each with a corresponding door mounting bracket. As illustrated in Fig. 19, multiple elongated vertical supports 20 are used. The door mounting brackets 130 are connected to a door receiving track assembly 134 via the mounting surfaces of the support assemblies 118 of the door mounting brackets 130.

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[0069] At least one door 136 can be mounted to the door receiving track assembly 134. As illustrated in phantom in Fig. 19, a plurality of doors 136 are slidably mounted in the door receiving track assembly 134. The door receiving track assembly 134 accordingly has two tracks, one for each door 136. In this manner, each door 136 can slide along the entire length of the door receiving track assembly 134. It is contemplated that other door mounting arrangements can be utilized. For example, the door receiving track assembly 134 can include pivot mounting portions on each end of the door receiving track assembly 134, in addition to a single track along the length of the door receiving track assembly 134. This allows for a bifolding door arrangement, in which each door is pivotably mounted on one end and slidably mounted on the other end, with a hinge separating each door into two halves. Another embodiment of the door mounting bracket 130 allows for pivotable doors to be mounted directly to the door mounting bracket 130. Yet another embodiment allows for an upper and lower door mounting bracket 130 to be mounted to each elongated vertical support 20, which allows each door to be pivotably mounted to the elongated vertical support 20 and supported from the top and the bottom. It is contemplated that the doors 136 can be pivotably or slidably mounted to the floor, to a lower track assembly mounted to the floor, to a lower track assembly mounted to lower door mounting brackets mounted to the elongated vertical supports 20, or to another door mounting bracket mounted in the lower portion of the elongated vertical support 20. The doors can be mounted hanging only from the top and remain hanging without any lower mounting. The storage system 10 can provide a closet space in an enclosure 1 that does not otherwise have a closet, without structurally modifying the enclosure 1. The storage system 10 can also allow for the mounting of slidable, hingeable, pivotable, or bifolding doors in a room where the ceiling is too tall to accommodate doors of normal height and/or without modifying the room.

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[0070] A cross-sectional structure of an elongated vertical support 220 is illustrated in Fig. 22. The structure of the elongated vertical support 220 is similar to the structure of a horizontal support 270, ^{not shown} both of which are other embodiments of the elongated vertical support 20 and the horizontal support 70 illustrated in previous figures. The front portion 226 of the elongated vertical support 220 includes a screw hole 250 to accommodate a screw or other fastener. The front portion 226 of the elongated vertical support 220 is further divided into a front left portion 252 and a front right portion 254. The front left portion 252 and front right portion 254 cooperate to form yet another channel 230 along the front portion 226 of the elongated vertical support 220. A pair of spaced ribs 238 extend laterally inward from the opening in the outer wall of the rear portion, i.e., the second panel receiving channel 242. The pair of spaced ribs 238 form a first panel receiving channel 240. The elongated vertical support 220 (and the horizontal support 270) includes corrugated surfaces along the front portion 226 and rear portion 228 of the elongated vertical support 220 to provide improved strength and visual design.

[0071]-In the embodiment of the elongated vertical support 220 and the horizontal support 270 shown in Fig. 22 with three channels 230, it is possible to provide a storage system-10 that arranges storage components around a corner formed by two walls.

Adjustable brackets 110 can be mounted at 90° to each other by using a channel 230 on the side and a channel 230 on the front of the elongated vertical support 220, corresponding to the interface between the two walls of the enclosure 1.

[0072] Adjustable brackets 110 that are provided separately from the storage components 120 allow the storage components 120 to be mounted to the elongated vertical support 20 so that they extend equally front wards and backwards from the elongated vertical support 20. They can also be mounted such that they extend further forward or further

rearward from the elongated vertical support 20, as necessary in a given installation configuration.

[0073] As shown in Fig. 23, a corner connector 140 can be constructed to arrange the horizontal support 70 at 90° to the elongated vertical support 20 when the elongated vertical support 20 and horizontal support are cut formed an angled connection. It is contemplated, however, that corner connectors can connect the horizontal support 70 with the elongated vertical support 20 at angles greater than or less than 90°.

[0074] The assembly of the storage system 10 will now be described in greater detail. The assembler located the desired number of vertical supports 20 in the enclosure 1. The vertical supports 20 are spaced to accommodate the desired storage components 120. The spacing between the vertical supports 20 does not have to be uniform; rather, the spacing is determined based upon the size of the dimensions of the storage components 120. For example, the distance between the vertical supports 20 may be greater to accommodate a hanger bar or longer shelves.

[0075] The floor/ceiling mounting process will now be described. Once the spacing between the vertical supports 20 is determined, the floor connection assemblies 54 are secured to the floor. The lower mounting member 50 is located in the lower end of the vertical support 20. The lower mounting member 50 is then located on the floor connection assembly 54. Using a level to ensure proper orientation, the vertical support 20 is placed in a vertical position in order to determine the mounting location on the ceiling. The vertical support 20 is then removed. The ceiling mounting member 62 is secured to the ceiling. The upper mounting member 60 is located in the upper end portion of the vertical support 20. The vertical support 20 is then reinstalled such that the lower mounting member 50 engages the floor connection assembly 54 and the upper mounting member 60 engages the ceiling

mounting member 62. The lower mounting member 50 and the upper mounting member 60 can be adjusted to ensure a tight fit between the floor and the ceiling.

[0076] The floor/wall mounting process will now be described. The horizontal track assembly 90 is secured to the wall at a desired height. The vertical supports 20 are then located on the horizontal track assembly 90 using the fixing blocks 76. Once the spacing between the vertical supports 20 is determined, the floor connection assemblies 54 can be secured to the floor. The lower mounting member 50 in the lower end of the vertical support 20 is then located on the floor connection assembly 54. The lower mounting member 50 and the upper mounting member 60 can be adjusted to adjust the height of the vertical support 20.

[0077] The desired storage components 120 are secured to vertical supports 20 using the necessary adjustable brackets 110. The engaging assembly 112 and the locking assembly 113 of the bracket 110 are located in the appropriate channel 30 within the vertical support 20. The engaging assembly 112 is located at the desired height. The fastener 114 is then rotated to rotate the locking assembly 113 within the channel 30 into a locked position. The rotation of the fastener 114 also serves to bring together the locking assembly 113 and the engaging assembly 112, such that they engage the channel 30. The storage component 120 is then secured to the adjustable bracket 110.

[0078] It will be appreciated that numerous modifications to and departures from the preferred embodiments described above will occur to those having skill in the art. Thus, it is intended that the present invention covers the modifications and variations of the invention, provided they come within the scope of the appended claims and their equivalents.